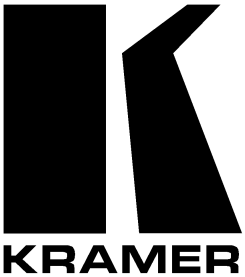
Kramer Electronics, Ltd.



USER MANUAL

Models:

VM-28HDMI, ***2 Input 1:8 HDMI Distributor***

VM-212HDMI, ***2 Input 1:12 HDMI Distributor***

VM-216HDMI, ***2 Input 1:16 HDMI Distributor***

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This addendum describes the new IR Receiver and RS-232 connector to the **VM-28HDMI** and **VM-216HDMI** machines. The user manual is updated in five places.

First change - add at the end of section 1 on page 1:

- Kramer **RC-IR1** Infra-Red Remote Control Transmitter (including the required battery and a separate user manual)

Second change - before section 3.1 on page 2:

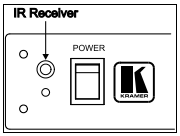
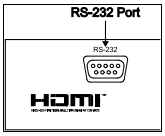
Control the **VM-28HDMI / VM-216HDMI** using the front panel buttons, and/or via:

- RS-232 serial commands transmitted by a PC or other serial controller
- The Kramer infra-red remote control transmitter

Third change - add after Table 1 in section 4 on page 4:

Table A1 describes the additional IR Receiver and RS-232 connector:

Table A1: IR Receiver and the RS-232 Connector Features

	**IR Receiver (front panel)** The red LED lights when receiving signals from the Infra-red remote control transmitter		**RS-232 DB 9F Port (rear panel)** Connects to the PC or the RS-232 Remote Controller

Fourth change - add before section 6 on page 13:

5.3 Controlling via RS-232 (for example, using a PC)

To connect a PC to the **VM-28HDMI / VM-216HDMI**, using the Null-modem adapter provided *with* the machine (recommended):

- Connect the RS-232 DB9 rear panel port on the **VM-28HDMI / VM-216HDMI** unit to the Null-modem adapter and connect the Null-modem adapter with a 9-wire flat cable to the RS-232 DB9 port on your PC

To connect a PC to the **VM-28HDMI / VM-216HDMI**, *without* using a Null-modem adapter:

- Connect the RS-232 DB9 port on your PC to the RS-232 DB9 rear panel port on the **VM-28HDMI / VM-216HDMI** unit, as Figure A1 illustrates

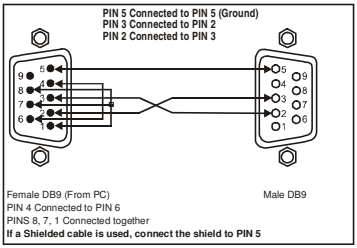

PIN 5 Connected to PIN 5 (Ground)
PIN 3 Connected to PIN 2
PIN 2 Connected to PIN 3
Female DB9 (From PC)
Male DB9
PIN 4 Connected to PIN 6
PINS 8, 7, 1 Connected together
If a Shielded cable is used, connect the shield to PIN 5

Figure A1: Connecting a PC without using a Null-modem Adapter

Fifth change - add after section 6 on page 13:

8 Kramer Protocol 2000

The **VM-28HDMI / VM-216HDMI** is compatible with Kramer's Protocol 2000 (version 0.46). You can download it from our Web site at: http://www.kramerelectronics.com

1 Introduction

Welcome to Kramer Electronics (since 1981): a world of unique, creative and affordable solutions to the infinite range of problems that confront the video, audio and presentation professional on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better! Our 500-plus different models now appear in 8 Groups[1], which are clearly defined by function.

Congratulations on purchasing your Kramer **VM-28HDMI** *2 Input 1:8 HDMI*[2] *Distributor*, **VM-212HDMI** *2 Input 1:12 HDMI Distributor*, and/or **VM-216HDMI** *2 Input 1:16 HDMI Distributor*! Each machine is ideal for:

- Home theater, presentation and multimedia applications
- Rental and staging

The package includes the following items:

- **VM-28HDMI / VM-212HDMI / VM-216HDMI**
- Power cord
- This user manual[3]

2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual
- Use Kramer high performance high resolution cables[4]

1 GROUP 1: Distribution Amplifiers; GROUP 2: Video and Audio Switchers, Matrix Switchers and Controllers; GROUP 3: Video, Audio, VGA/XGA Processors; GROUP 4: Interfaces and Sync Processors; GROUP 5: Twisted Pair Interfaces; GROUP 6: Accessories and Rack Adapters; GROUP 7: Scan Converters and Scalers; and GROUP 8: Cables and Connectors

2 High-Definition Multimedia Interface

3 Download up-to-date Kramer user manuals from the Internet at this URL: http://www.kramerelectronics.com

4 The complete list of Kramer cables is on our Web site at http://www.kramerelectronics.com

3 Overview

Each high quality *HDMI Distributor* accepts one of two HDMI inputs, and distributes the selected signal to:

- 8 outputs (the **VM-28HDMI**)
- 12 outputs (the **VM-212HDMI**)
- 16 outputs (the **VM-216HDMI**)

Each machine—the **VM-28HDMI**, **VM-212HDMI**, and **VM-216HDMI**—has:

- Support for up to 1.65Gbps bandwidth per graphic channel[1]
- The ability to read and store, in non-volatile memory[2], the EDID[3] block at each input[4] from an output display device, so it can then provide the EDID information to the HDMI source even if the display device is not connected
- A default EDID for fast and efficient connection of the unit[5]
- Three modes of operation: the Distribution mode[6], the EDID mode[7], and the EDID Reset mode[7]
- A 19" 1U rack-mountable enclosure, and is fed from a 100-264 VAC universal switching power supply

3.1 About HDMI

High-Definition Multimedia Interface (HDMI) is an uncompressed all-digital[8] audio/video interface, widely supported in the entertainment and home cinema industry. It delivers the highest high-definition image and sound quality. Note that Kramer Electronics Limited is an HDMI Adopter[9] and an HDCP Licensee[10].

1 Suitable for resolutions up to UXGA at 60Hz, and for all HD resolutions

2 While the machine is ON

3 EDID is Extended Display Identification Data (see section 3.2 for a detailed definition)

4 Independently. Each input can be set with its own EDID block

5 Lets you use the EDID default value when no display from which to read the EDID is connected

6 Used to distribute an input signal to several outputs

7 See section 5.2

8 Ensuring an all-digital rendering of video without the losses associated with analog interfaces and their unnecessary digital-to-analog conversions

9 See http://www.hdmi.org/about/adopters_founders.asp

10 See http://www.digital-cp.com/list/

In particular, HDMI:

- Provides a simple[1] interface between any audio/video source, such as a set-top box, DVD player, or A/V receiver and video monitor, such as a digital flat LCD / plasma television (DTV), over a single lengthy[2] cable
- Supports standard, enhanced, high-definition video, and multi-channel digital audio[3] on a single cable
- Transmits all ATSC HDTV standards and supports 8-channel digital audio, with bandwidth to spare to accommodate future enhancements and requirements
- Benefits consumers by providing superior, uncompressed digital video quality via a single cable[4], and user-friendly connector
- Is backward-compatible with DVI (Digital Visual Interface)
- Supports two-way communication between the video source (such as a DVD player) and the digital television, enabling new functionality such as automatic configuration and one-button play

HDMI has the capacity to support existing high-definition video formats (720p, 1080i, and 1080p/60), as well as standard definition formats such as NTSC or PAL

3.2 Defining EDID

The Extended Display Identification Data (EDID[5]) is a data-structure, provided by a display, to describe its capabilities to an HDMI source. The EDID enables the **VM-28HDMI / VM-212HDMI / VM-216HDMI** to "know" what kind of monitor is connected to the output. The EDID includes the manufacturer's name, the product type, the timing data supported by the display, the display size, luminance data and (for digital displays only) the pixel mapping data.

1 With video and multi-channel audio combined into a single cable, the cost, complexity, and confusion of multiple cables currently used in A/V systems is reduced

2 HDMI technology has been designed to use standard copper cable construction at up to 15m

3 HDMI supports multiple audio formats, from standard stereo to multi-channel surround-sound. HDMI has the capacity to support Dolby 5.1 audio and high-resolution audio formats

4 HDMI provides the quality and functionality of a digital interface while also supporting uncompressed video formats in a simple, cost-effective manner

5 Defined by a standard published by the Video Electronics Standards Association (VESA)

3.3 Recommendations for Best Performance

To achieve the best performance:

- Connect only good quality connection cables, thus avoiding interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables)
- Avoid interference from neighboring electrical appliances and position your **VM-28HDMI / VM-212HDMI / VM-216HDMI** away from moisture, excessive sunlight and dust

4 Your VM-28HDMI / VM-212HDMI / VM-216HDMI

This section illustrates the:

- **VM-28HDMI**, see Figure 1
- **VM-212HDMI**, see Figure 2
- **VM-216HDMI**, see Figure 3

Table 1 defines the front and rear panels:

Table 1: VM-28HDMI / VM-212HDMI / VM-216HDMI Features

#	Feature		Function
1	*POWER* Switch		Illuminated switch for turning the unit ON or OFF
2	*SELECT*	*IN 1* Button[1]	Press to select source 1 and distribute this signal to the outputs (when the EDID button is not illuminated). Also used for acquiring/changing the EDID (see section 5.2.2)
3		*IN 2* Button[1]	Press to select source 2 and distribute this signal to the outputs (when the EDID button is not illuminated). Also used for acquiring/changing the EDID (see section 5.2.2)
4	*EDID* Button[2]		Press for more than 3 seconds to set to the EDID mode
5	*LOCK* Button[3]		Press to engage/disengage the front panel switches
6	*OUTPUT STATUS* LEDs		LEDs light when an output(s) is connected and active; LEDs blink when selecting the EDID (see section 5.2.2) or when connecting a non-HDCP display while providing HDCP content to the **VM-28HDMI** / **VM-212HDMI** / **VM-216HDMI**
7	*INPUT 1* HDMI Connector		Connects to the HDMI source 1
8	*INPUT 2* HDMI Connector		Connects to the HDMI source 2
9	*OUTPUT* HDMI Connector		Connects to the HDMI acceptor [from 1 to 8 (**VM-28HDMI**), from 1 to 12 (**VM-212HDMI**), from 1 to 16 (**VM-216HDMI**)]
10	Power Connector with Fuse		AC connector enabling power supply to the unit

1 Illuminates when selected and there is a signal, blinks when selected but there is no signal

2 Illuminates when configuring the EDID. When the EDID button is not illuminated the machine is in Distribution mode (lets you distribute an input signal to the outputs)

3 Illuminates when the front panel switches are locked, pressing another button causes the LOCK button to blink once warning that you need to unlock to regain control via the front panel. The LOCK button also blinks (the IN 1, IN 2 and EDID buttons do not blink at the same time) when the machine is busy (perhaps searching between signals) and no operation is permitted

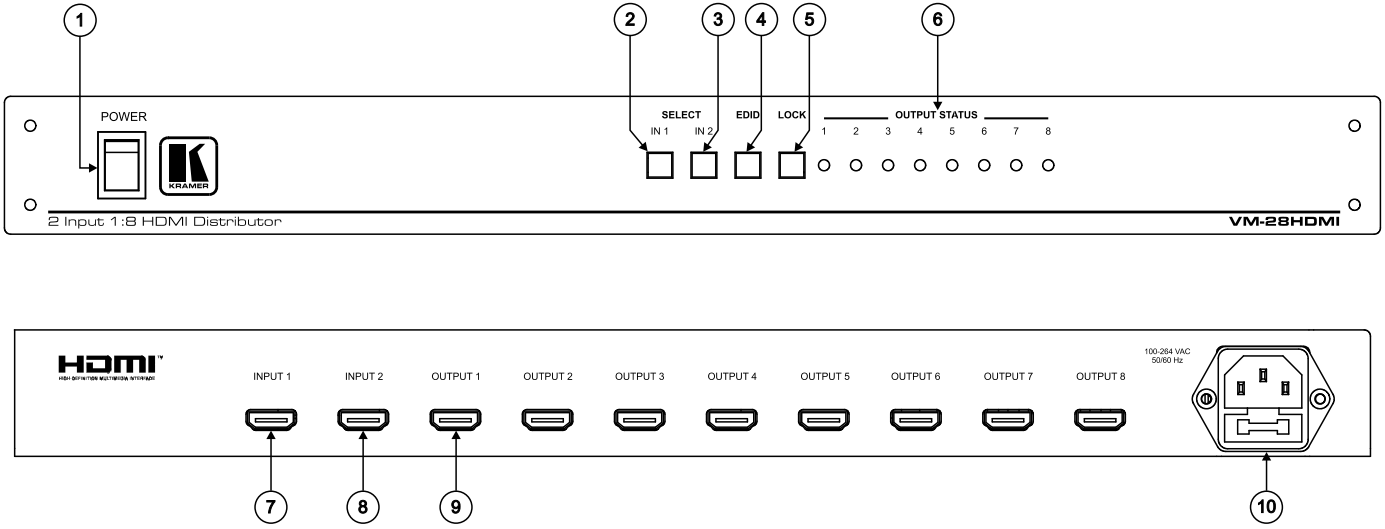


Figure 1: VM-28HDMI 2 Input 1:8 HDMI Distributor

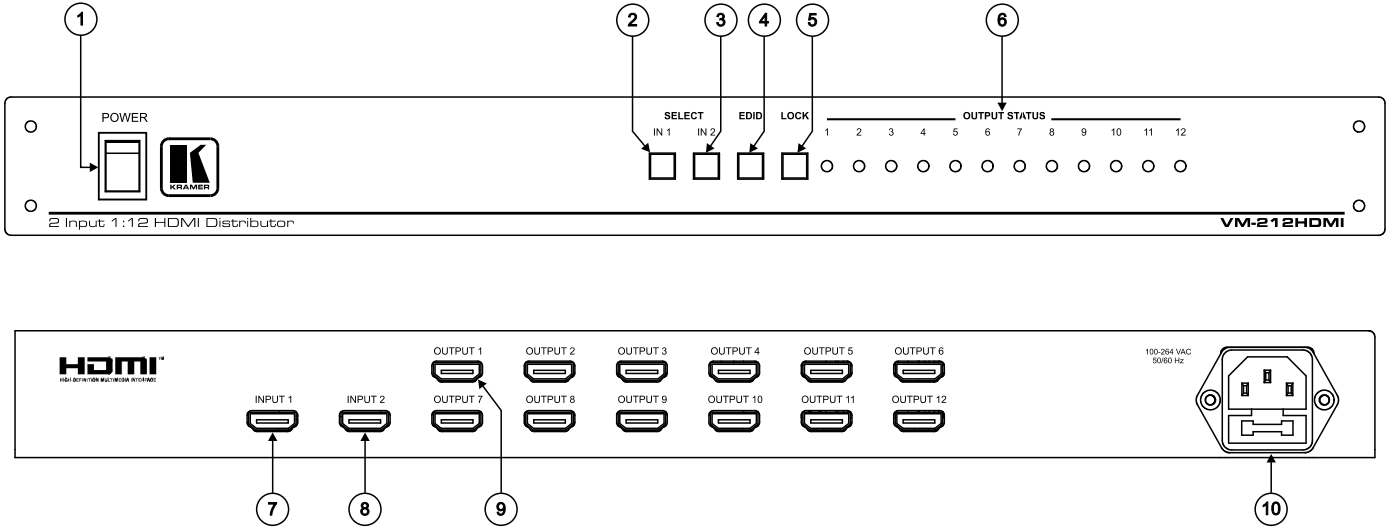


Figure 2: VM-212HDMI 2 Input 1:12 HDMI Distributor

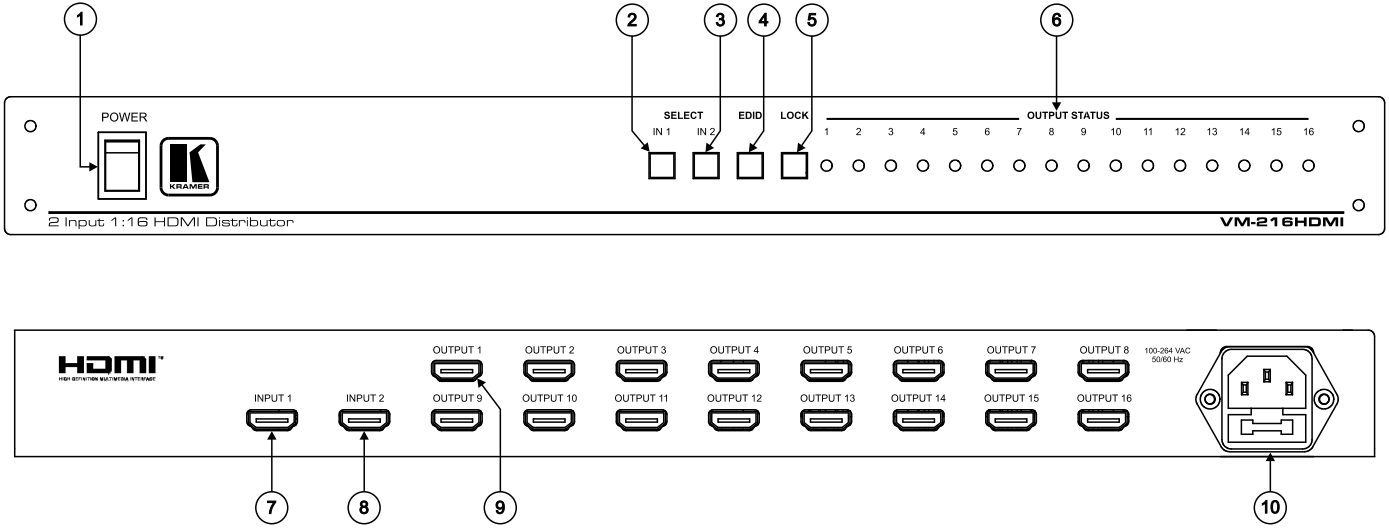


Figure 3: VM-216HDMI 2 Input 1:16 HDMI Distributor

5 Using the VM-28HDMI / VM-212HDMI / VM-216HDMI

This section describes how to:

- Connect the **VM-28HDMI / VM-212HDMI / VM-216HDMI**, see section 5.1
- Operate the **VM-28HDMI / VM-212HDMI / VM-216HDMI**, see section 5.2
- Use the EDID button, see section 5.2.1

5.1 Connecting the VM-28HDMI / VM-212HDMI / VM-216HDMI

This section describes how to connect the:

- **VM-28HDMI**, see section 5.1.1
- **VM-212HDMI**, see section 5.1.2
- **VM-216HDMI**, see section 5.1.3

5.1.1 Connecting the VM-28HDMI 2 Input 1:8 HDMI Distributor

To connect the **VM-28HDMI**, as the example in Figure 4 shows, do the following[1]:

1. Connect the HDMI OUTPUT connectors[2] to up to 8 HDMI acceptors, using Kramer HDMI copper cables. In this example[3], connect the:
   - OUTPUT 1 connector to acceptor 1 (for example, a plasma display)
   - OUTPUT 2 connector to acceptor 2 (for example, an LCD TV)
   - OUTPUT 7 connector to acceptor 7 (for example, an LCD TV)
   - OUTPUT 8 connector to acceptor 8 (for example, a plasma display)
2. Connect the two HDMI sources, for example, a DVD player and a set top box, to the INPUT 1 and INPUT 2 connectors, respectively, using the Kramer HDMI copper cables.
3. Connect the power cord to the mains electricity.

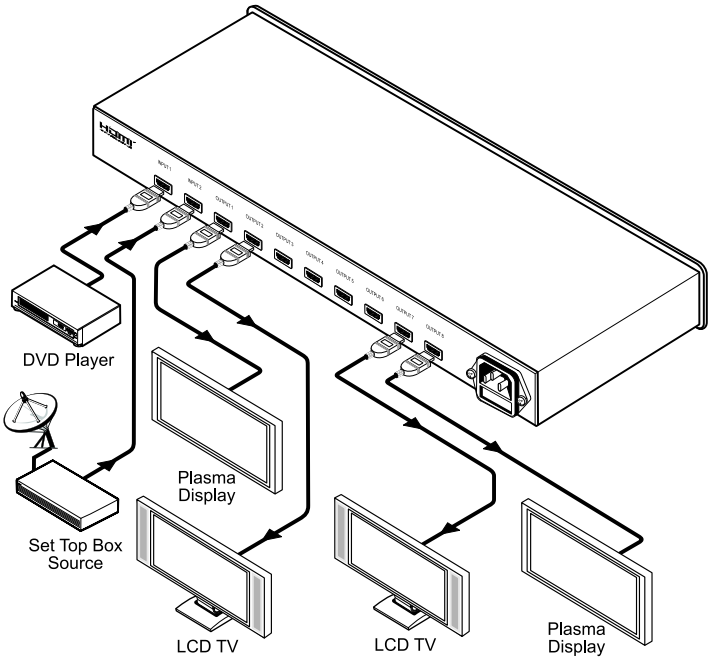


Figure 4: Connecting a VM-28HDMI 2 Input 1:8 HDMI Distributor

1 Switch OFF the power on each device before connecting it to your VM-28HDMI. After connecting your VM-28HDMI, switch on its power and then switch on the power on each device

2 As required. Up to 8 outputs can be connected. Not all outputs need to be connected

3 Only connections from the first two acceptors and the last two acceptors are shown in Figure 4

5.1.2 Connecting the VM-212HDMI 2 Input 1:12 HDMI Distributor

To connect the **VM-212HDMI**, as the example in Figure 5 shows, do the following[1]:

1. Connect the HDMI OUTPUT connectors[2] to up to 12 HDMI acceptors, using Kramer HDMI copper cables. In this example[3], connect the:
   - OUTPUT 1 connector to acceptor 1 (for example, a plasma display)
   - OUTPUT 2 connector to acceptor 2 (for example, an LCD TV)
   - OUTPUT 11 connector to acceptor 11 (for example, an LCD TV)
   - OUTPUT 12 connector to acceptor 12 (for example, a plasma display)
2. Connect the two HDMI sources, for example, a DVD player and a set top box, to the INPUT 1 and INPUT 2 connectors, respectively, using the Kramer HDMI copper cables.
3. Connect the power cord to the mains electricity.

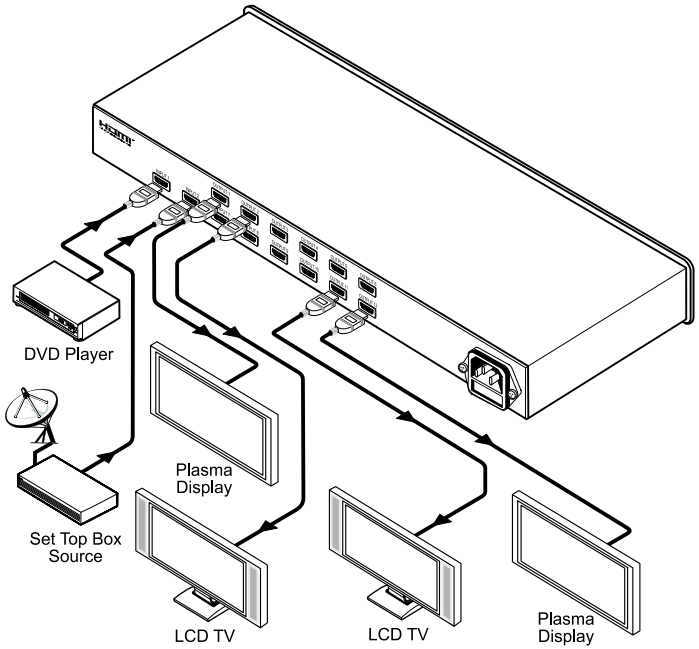


Figure 5: Connecting a VM-212HDMI 2 Input 1:12 HDMI Distributor

1 Switch OFF the power on each device before connecting it to your VM-212HDMI. After connecting your VM-212HDMI, switch on its power and then switch on the power on each device

2 As required. Up to 12 outputs can be connected. Not all outputs need to be connected

3 Only connections from the first two acceptors and the last two acceptors are shown in Figure 5

5.1.3 Connecting the VM-216HDMI 2 Input 1:16 HDMI Distributor

To connect the **VM-216HDMI**, as the example in Figure 6 shows, do the following[1]:

1. Connect the HDMI OUTPUT connectors[2] to up to 16 HDMI acceptors, using Kramer HDMI copper cables. In this example[3], connect the:
   - OUTPUT 1 connector to acceptor 1 (for example, a plasma display)
   - OUTPUT 2 connector to acceptor 2 (for example, an LCD TV)
   - OUTPUT 15 connector to acceptor 15 (for example, an LCD TV)
   - OUTPUT 16 connector to acceptor 16 (for example, a plasma display)
2. Connect the two HDMI sources, for example, a DVD player and a set top box, to the INPUT 1 and INPUT 2 connectors, respectively, using the Kramer HDMI copper cables.
3. Connect the power cord to the mains electricity.

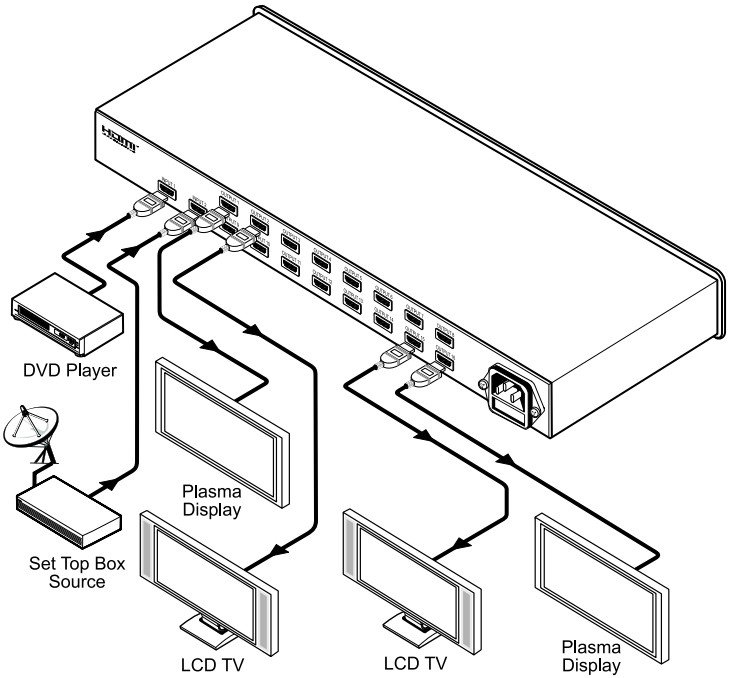


Figure 6: Connecting a VM-216HDMI 2 Input 1:16 HDMI Distributor

1 Switch OFF the power on each device before connecting it to your VM-216HDMI. After connecting your VM-216HDMI, switch on its power and then switch on the power on each device

2 As required. Up to 16 outputs can be connected. Not all outputs need to be connected

3 Only connections from the first two acceptors and the last two acceptors are shown in Figure 6

5.2 Operating the VM-28HDMI / VM-212HDMI / VM-216HDMI

1. Turn ON the POWER.
2. Select the desired input.
3. Press the EDID button to acquire or change the EDID data (see section 5.2.1).

5.2.1 Using the EDID Button

Initially, the **VM-28HDMI / VM-212HDMI / VM-216HDMI** operates with the factory default EDID.

5.2.2 Acquiring / Changing the EDID

You can work with the default EDID or acquire or change an EDID via one of the connected outputs. Each input is assigned with its own (individual) EDID block. Use the EDID button to acquire the output EDID information.

To acquire or change the EDID of a new output display:

1. Connect the power supply.
2. Connect the new output display device.
3. Press the EDID button for more than 3 seconds to set the machine to the EDID Reset mode.
4. Press an input button (either IN 1 or IN 2)[1] once.
   The selected input button illuminates.
5. Press that input button to set the appropriate OUTPUT STATUS LED.
   The OUTPUT STATUS LED blinks indicating that that output channel is selected.
6. Press the LOCK button to copy the EDID of the selected OUTPUT to the input.
   Note: to cancel the EDID modification, press the EDID button before pressing the LOCK button.
   While the EDID is being copied the EDID button blinks. The new EDID is copied, when the EDID button no longer blinks.

5.2.3 Resetting the Default EDID

To reset the default EDID, do the following:

- Repeat the steps in section 5.2.2 while selecting an output to which no device is connected

1 Depending if you want to copy the new EDID to input 1 or to input 2

6 Technical Specifications

Table 2 includes the technical specifications[1] of the **VM-28HDMI**, **VM-212HDMI** and **VM-216HDMI**:

Table 2: VM-28HDMI / VM-212HDMI / VM-216HDMI Technical Specifications

	VM-28HDMI	**VM-212HDMI**	**VM-216HDMI**
INPUTS:	2 on HDMI Connectors	2 on HDMI Connectors	2 on HDMI Connectors
OUTPUTS:	8 on HDMI Connectors	12 on HDMI Connectors	16 on HDMI Connectors
BANDWIDTH:	Supports up to 1.65Gbps bandwidth per graphic channel		
COMPLIANCE WITH HDMI STANDARD:	Supports HDMI 1.2 and HDCP		
CONTROLS:	EDID, IN 1, IN 2 and, LOCK buttons		
INDICATOR LEDs:	OUTPUT STATUS LEDs		
POWER SOURCE:	100-264 VAC 50/60Hz 27VA	100-264 VAC 50/60Hz 31VA	
DIMENSIONS:	19-inch (W), 7-inch (D), 1U (H)		
WEIGHT:	2.5 kg. (5.5 lbs.) approx.		
ACCESSORIES:	Power cord		
OPTIONS:	HDMI/HDMI male-to-male cables, Fiber Optic HDMI Cable (C-FOHM/FOHM)		

1 Specifications are subject to change without notice

LIMITED WARRANTY

Kramer Electronics (hereafter *Kramer*) warrants this product free from defects in material and workmanship under the following terms.

HOW LONG IS THE WARRANTY

Labor and parts are warranted for seven years from the date of the first customer purchase.

WHO IS PROTECTED?

Only the first purchase customer may enforce this warranty.

WHAT IS COVERED AND WHAT IS NOT COVERED

Except as below, this warranty covers all defects in material or workmanship in this product. The following are not covered by the warranty:

1. Any product which is not distributed by Kramer, or which is not purchased from an authorized Kramer dealer. If you are uncertain as to whether a dealer is authorized, please contact Kramer at one of the agents listed in the web site www.kramerelectronics.com.
2. Any product, on which the serial number has been defaced, modified or removed.
3. Damage, deterioration or malfunction resulting from:
   - i) Accident, misuse, abuse, neglect, fire, water, lightning or other acts of nature
   - ii) Product modification, or failure to follow instructions supplied with the product
   - iii) Repair or attempted repair by anyone not authorized by Kramer
   - iv) Any shipment of the product (claims must be presented to the carrier)
   - v) Removal or installation of the product
   - vi) Any other cause, which does not relate to a product defect
   - vii) Cartons, equipment enclosures, cables or accessories used in conjunction with the product

WHAT WE WILL PAY FOR AND WHAT WE WILL NOT PAY FOR

We will pay labor and material expenses for covered items. We will not pay for the following:

1. Removal or installations charges.
2. Costs of initial technical adjustments (set-up), including adjustment of user controls or programming. These costs are the responsibility of the Kramer dealer from whom the product was purchased.
3. Shipping charges.

HOW YOU CAN GET WARRANTY SERVICE

1. To obtain service on you product, you must take or ship it prepaid to any authorized Kramer service center.
2. Whenever warranty service is required, the original dated invoice (or a copy) must be presented as proof of warranty coverage, and should be included in any shipment of the product. Please also include in any mailing a contact name, company, address, and a description of the problem(s).
3. For the name of the nearest Kramer authorized service center, consult your authorized dealer.

LIMITATION OF IMPLIED WARRANTIES

All implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this warranty.

EXCLUSION OF DAMAGES

The liability of Kramer for any effective products is limited to the repair or replacement of the product at our option. Kramer shall not be liable for:

1. Damage to other property caused by defects in this product, damages based upon inconvenience, loss of use of the product, loss of time, commercial loss; or:
2. Any other damages, whether incidental, consequential or otherwise. Some countries may not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary from place to place.
NOTE: All products returned to Kramer for service must have prior approval. This may be obtained from your dealer.
This equipment has been tested to determine compliance with the requirements of:

EN-50081:	"Electromagnetic compatibility (EMC); generic emission standard. Part 1: Residential, commercial and light industry"
EN-50082:	"Electromagnetic compatibility (EMC) generic immunity standard. Part 1: Residential, commercial and light industry environment".
CFR-47:	FCC Rules and Regulations: Part 15: "Radio frequency devices Subpart B – Unintentional radiators"

CAUTION!

- ⊠ Servicing the machines can only be done by an authorized Kramer technician. Any user who makes changes or modifications to the unit without the expressed approval of the manufacturer will void user authority to operate the equipment.
- ⊠ Use the supplied DC power supply to feed power to the machine.
- ⊠ Please use recommended interconnection cables to connect the machine to other components.

For the latest information on our products and a list of Kramer distributors, visit our Web site: www.kramerelectronics.com, where updates to this user manual may be found.
We welcome your questions, comments and feedback.

Safety Warning:
Disconnect the unit from the power supply before opening/servicing.

Kramer Electronics, Ltd.
Web site: www.kramerelectronics.com
E-mail: info@kramerel.com
P/N: 2900-000185 REV 1